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10/693,786	10/24/2003	Guo-Xin Jin	2002B181B	2340

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EXAMINER

MCDONOUGH, JAMES E

ART UNIT	PAPER NUMBER
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1755

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	04/13/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/693,786

Applicant(s)

JIN ET AL.

Examiner

James E. McDonough

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 March 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4 and 7-78 is/are pending in the application.
- 4a) Of the above claim(s) 17-19, 21 and 22 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4, 7-16, 20 and 23-78 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

(1) Applicant's arguments, see page 30, paragraph 3, and page 31, paragraph 3, claims 30-33, filed 3/13/2007, with respect to claims 14-16, 18-20, 23, and 30-33 have been fully considered and are persuasive. The rejections have been withdrawn.

Original Rejection

(2) 3. 35 U.S.C. 112, first paragraph, requires the specification to be written in "full, clear, concise, and exact terms." The specification is replete with terms, which are not clear, concise and exact. The specification should be revised carefully in order to comply with 35 U.S.C. 112, first paragraph. Examples of some unclear, inexact or verbose terms used in the specification are: there is not a single subscript in the entire specification, even though it is filled with chemical formulae.

(3) 5. Claims 30-33 are rejected under 35 U.S.C. 101 because the disclosed invention is inoperative and therefore lacks utility. Claims 30-33 are drawn to metals of groups 3 and 5-10 of the periodic table. However, from the structures drawn in claim 30, these metals must be in the 4+ oxidation state. Group 3 metals are not capable of achieving this oxidation state since they have insufficient valence electrons to do so. For group 5 and higher metals, the structures as drawn would violate the 18 electron rule of organometallic chemistry since each Ligand would donate 5 electrons and each D and E ligand would donate one electron to the metal's valence d orbitals which would already be populated by at least 5 electrons from the metal atom itself, resulting in at

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least 17 electrons in the frontier orbitals of the metal compound. There would need to be an unfilled valence orbital on the metal compound into which the pi electrons of an olefin molecule would be capable of donating, but when the olefin donates these two pi electrons, the electron count on the metal compound would exceed 18, meaning antibonding orbitals of the metal compound would begin being populated, resulting in weakening and likely even breaking of metal-ligand bonds. Such a compound would not be capable of carrying out the olefin polymerization process envisioned for the presently-claimed compositions. In addition, the examiner notes that all the working examples in the specification are drawn to group 4 metals; no other metal is exemplified, likely because it is inoperable.

(4)6. Claims 30-33 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter, which, was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. As noted in paragraph 5 above, the metals required for the catalyst compound would be either in an oxidation state they cannot attain, or the compounds would exceed the 18 electron rule and thus not be capable of more than fleeting existence.

(5) 7. Claims 20, 24 and 30 are objected to because of the following informalities: in claim 20, if TM may only be titanium, it would be far less ambiguous to simply change the symbol in the structures to Ti.

(6) 11. Claims 1-4, 7-16, 20, 24-29 and 34-78 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Schertl et al., USP 5,770,755 (hereafter referred to as Schertl).

Schertl discloses a polymeric metallocene catalyst composition made using a combination of a metallocene having a polymerizable side group and an olefin (abstract; col. 1, 1. 60 to col. 2, 1. 26; col. 3, 1. 8-50; col. 4, 1. 35-67; col. 6, 1. 25-35; examples).

Schertl lacks disclosure that the composition is made by polymerizing the finished metallocene with or without the presence of the comonomer, instead disclosing making a polymeric cyclopentadienyl ligand first, then reacting this composition with a transition metal compound to make the polymeric metallocene.

However, the current claims are couched in product-by-process language, hence the finished product appears to be identical to that of the prior art. Since the prior art appears to describe and teach the invention as claimed on the basis of inherent property characteristics which either anticipate or render obvious the claimed invention, an alternative 102/103 rejection is deemed appropriate, and the burden of proof that it does or does not falls to applicants as in In re Best, 195 USPQ 430, 433 (CCPA 1977).

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(7) 12. Claims 1-4, 7-16, 20 and 23-78 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schertl as cited above.

The disclosure of Schertl has been discussed above. Schertl lacks disclosure of more than one metallocene compound being in the polymerized catalyst product. However, such a modification is well within the skill of the routineer in the art. It would have been obvious to one of ordinary skill in the art to apply that skill to the disclosure of Schertl with a reasonable expectation of obtaining a highly-useful polymeric catalyst compound with the expected benefit of the catalyst not fouling the reactor.

(8) 13. Claims 1-4, 7-16, 20 and 24-78 are rejected under 35 U.S.C. 103(a) as being unpatentable over Antberg et al., USP 5,169,818 (hereafter referred to as Antberg).

Antberg discloses a polymeric metallocene compound having as comonomer an olefin, the composition being made by copolymerizing metallocenes with olefinic side groups and olefins using free radical initiators as the catalysts for polymerization (abstract; col. 2, 1. 1 to col. 6, 1. 35).

Antberg lacks disclosure of the use of titanium as the metal for the metallocenes. However, the metals Antberg uses are hafnium and zirconium, the other two members of group 4 of the periodic table. It would have been obvious to one of ordinary skill in the art to apply that skill to the disclosure of Antberg with a reasonable expectation of obtaining a highly-useful olefin polymerization catalyst with the expected benefit of the catalyst being insoluble in ordinary organic solvents.

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(9) 14. Claims 1-4, 7-16, 20 and 24-78 are rejected under 35 U.S.C. 103(a) as being unpatentable over Antberg as cited above in view of Schertl as cited above.

The disclosure of Antberg has been discussed above. Antberg lacks disclosure of titanium as the metal in the metallocene compounds. However, Schertl teaches that titanium is useable as the metal in polymeric metallocenes (col. 6, 1. 25-28). It would have been obvious to one of ordinary skill in the art to apply the teaching of Schertl to the disclosure of Antberg with a reasonable expectation of obtaining a highly-useful olefin polymerization catalyst with the expected benefit of the catalyst being more economical to prepare as well as not fouling olefin polymerization reactors.

(10) 15. Claims 1-4, 7-16, 20 and 23-78 are rejected under 35 U.S.C. 103(a) as being unpatentable over Antberg as cited above in view of Chabrand et al., USP 5,714,425 (hereafter referred to as Chabrand).

The disclosure of Antberg has been discussed above. Antberg lacks disclosure of the use of plural metallocene compounds in its polymeric metallocene catalyst. However, Chabrand teaches that such a modification is conventional in the art (col. 4, 1. 64 to col. 5, 1. 20). It would have been obvious to one of ordinary skill in the art to apply the teaching of Chabrand to the disclosure of Antberg with a reasonable expectation of obtaining a highly-useful olefin polymerization catalyst with the expected benefit of the polymers made using the catalysts having good processability.

Response to Arguments

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(11) Applicants do not address U.S.C. 112, first paragraph rejection over the specification. Therefore, it is assumed that they do not traverse this rejection.

(12) Applicants argue on page 29, paragraphs 1-3 of the reply filed 3/13/2007 are found to be not persuasive because of the following, that the references do not teach certain embodiments of the cyclopentadienyl ligands used as precursors for their composition. However, as stated in the previous office action this amounts to a product-by-process and the way a composition is made does not patentably distinguish it from the same or similar composition. Furthermore, the Shertl et al. reference clearly discloses the benefits of having a catalyst that is not soluble in the diluent, such as preventing fouling of the reactor and preventing deleterious effects on the heat transfer (column 1, lines 9-35).

It is well settled that when a claimed composition appears to be substantially the same as a composition disclosed in the prior art, the burden is properly upon the applicant to prove by way of tangible evidence that the prior art composition does not necessarily possess characteristics attributed to the CLAIMED composition. In re Spada, 911 F.2d 705, 15 USPQ2d 1655 (Fed. Circ. 1990); In re Fitzgerald, 619 F.2d 67, 205 USPQ 594 (CCPA 1980); In re Swinehart, 439 F.2d 2109, 169 USPQ 226 (CCPA 1971).

Product-by-process claims do not patentably distinguish the product of reference even though made by a different process. In re Thorpe, 227 U.S.P.Q. 964.

Additionally, even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985).

In the event any differences can be shown for the product of the product-by-process claims, as opposed to the product taught by the prior art, such differences would have been obvious to one of ordinary skill in the art as a routine modification of the product in the absence of a showing of unexpected results. In re Thorpe, 227 USPQ 964 (Fed. Cir. 1985).

Proof the claimed compounds possess an unobvious or unexpected beneficial property does not, automatically, establish patentability. In re Finley (CCPA 1949) 174 F2d 130, 81 U.S.P.Q. 383. A single variance in properties will not necessarily tip the balance in favor of patentability. In re De Montmollin, et al. (CCPA 1965) 344 F2d 976, 145 U.S.P.Q. 416.

(13) Applicants argue that group 5-10 metal can have oxidation states above +4, and provide reference material showing this to be the case, and then argue that their amendment obviates these rejections, however, this is found to be not persuasive because, the original examiner did not argue that group 5-10 metals can not have an oxidation state of +4, which, they certainly can, but that the compounds shown violate

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the 18 electron rule of metal complexes. This rule can be found in the same reference applicants submitted to show +4 oxidation states, and is found at section 16-3, paragraph 2 of the reference. The current examiner agrees with the applicants that these metals can have these oxidation states, but there is still the problem with the electron count on these complexes. Furthermore, applicants do not address the last sentence from paragraph 5 of the previous office action stated again "In addition, the examiner notes that all the working examples are drawn to group 4 metals; no other metal is exemplified, likely because it is inoperable".

(14) Applicants argue that using TM as a symbol for the metal is not confusing and, someone of ordinary skill in the art would not confuse this for the symbol for trademark. However, this is found to be not persuasive because, the skilled artisan would recognize that the unskilled person could be confused in this matter, also in this art and in most others M is used to define metal not TM. Furthermore, changing this symbol will 1.) help to make it more clear what the applicants regard as their invention and 2.) help future researchers in finding and locating this reference and instantly recognizing what matter is taught, without undue reading and interpretation of the specification. Simply changing this to Ti as suggested by the original examiner or by changing it to M would clear up this problem.

(15) Applicants argue the 102/103 rejection over Schertl et al., however, this argument is found not persuasive because as stated above, applicants are arguing a product-by-process limitation.

(16) Applicants argue the 103 rejection over Antberg et al., stating that Antberg et al. does not teach titanium, however, this is found not persuasive because the in the abstract it clearly calls for group IVb metals, of which titanium is clearly a member.

Applicants argue that the Antberg et al. reference does not teach group 5-10 metals. This argument is found to be persuasive and this rejection over claims 30-33 has been withdrawn.

Applicants further argue that the Antberg et al. does not teach bridged monocyclopentadienyl catalyst systems, as recited in claim 24, however, this is found not persuasive because, upon reviewing claim 24, the examiner could not find any limitation requiring a bridged monocyclopentadienyl.

(17) Applicants argue the 103 rejection over Antberg et al. in view of Schertl. Applicants state that the examiner has not established a prima facie case of obviousness, and go on to state that the examiner must explain the reasoning one of ordinary skill would be motivated, and further if no explanation is given it is inferred that the examiner used hindsight. This argument is found not persuasive because 1.) The original examiner does give motivation for the combination, that being that catalyst will be more economical to prepare and as well as not fouling the reactor. 2.) The motivation

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of not fouling the reactor can be clearly found in the Schertl et al. reference (column 1, lines 9-34) 3.) It is well known that titanium being the 4th most abundant metal in the earths crust is obtained at lower prices than the other group 4 metals. 4.) In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

Applicants further argue that "it has long been established that catalysis is generally considered unpredictable merely from the chemical nature of the catalyst", "catalytic effects are not ordinarily predictable with certainty", and "The effect of a modification of one prior art catalytic process in a manner employed in another prior art process which employs a different catalyst is unpredictable." And applicants cite case law to this effect, however, this is found not persuasive because 1.) while it is true that catalytic effects can not be predicted with certainty, this is also true of all chemistry in general, but to completely ignore the theoretical predictability is to belie the science of chemistry, there are general trends which typically are followed such as decrease in bond strength as you go down a column, an increase in electronegativity as you move to the right across a row, etc., an example of this would be if one catalytic class is found to be more reactive in going from say zirconium to titanium, another similar catalyst

class would also be expected to be more reactive when going from zirconium to titanium, although, this is not always the case, it is the unpredictability that gives rise to unexpected results, of which, applicants have not shown any over the prior art 2.) the argument that "The effect of a modification of one prior art catalytic process in a manner employed in another prior art process which employs a different catalyst is unpredictable.", is not persuasive because the references teaches same or similar catalyst.

Further still, applicants argue that "it is well known in the literature and the art that variations in catalyst structures produce substantial polymer differences. Accordingly, there is no expectation that the catalyst of the claimed invention have similar catalytic effects of Antberg and Schertl", however, applicants have not persuasively pointed out the differences between their catalyst and that of the prior art. Furthermore, applicants provide no evidence of superior results with their catalytic system.

(18) Applicants argue the 103 rejection over Antberg in view of Chabrand et al.. The first part of their argument involves piecemeal analysis of the references. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Applicants then go on to argue the same point of the unpredictability in catalytic systems, which, were discussed above.

(19) THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

(20) Any inquiry concerning this communication or earlier communications from the examiner should be directed to James E. McDonough whose telephone number is (571)272-6398. The examiner can normally be reached on 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jerry Lorengo can be reached on (571)272-1233. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JEM 4/3/2007 .

Aileen Felton
AILEEN FELTON
PRIMARY EXAMINER